

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

## Volume 5 | Technical Appendices

CFA21 | Drayton Bassett, Hints and Weeford

**Data appendix (AG-001-021)**

Agriculture, forestry and soils

November 2013

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Department  
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# Appendix AG-001-021

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# 1 Introduction

1.1.1 The agriculture, forestry and soils appendices for the Drayton Bassett, Hints and Weeford community forum area (CFA21) comprise:

- Soils and agricultural land classification surveys (Section 2);
- Forestry (Section 3); and
- Farm impact assessment summaries (Section 4).

1.1.2 Maps referred to throughout the agriculture, forestry and soils appendix are contained in the Volume 5 agriculture, forestry and soils map book.

## 2 Soils and agricultural land classification surveys

### 2.1 Background

- 2.1.1 The soils and agricultural baseline conditions reported have been established from desktop studies and site surveys.
- 2.1.2 Information gathered by desktop studies has related primarily to the identification of soil resources in the study area, the associated physical characteristics of geology, topography and climate which underpin the assessment of agricultural land quality, and the disposition of land uses. The main sources of information have included:
- National Soil Map<sup>1</sup>;
  - Soils and Their Use in Midland and Western England<sup>2</sup>;
  - Soils in Staffordshire IV Sheet SK00/10 (Lichfield)<sup>3</sup>;
  - Solid and superficial deposits from the Geology of Britain viewer<sup>4</sup>;
  - Gridpoint meteorological data for Agricultural Land Classification of England and Wales<sup>5</sup>;
  - Provisional Agricultural Land Classification of England and Wales (1:250,000)<sup>6</sup>;
  - Likelihood of Best and Most Versatile Agricultural Land (1:250,000)<sup>7</sup>;
  - Agri-environment schemes<sup>8</sup>;
  - Aerial photography from Google Earth; and
  - On-site soil and Agricultural Land Classification surveys.
- 2.1.3 Information gathered by field survey<sup>9</sup> has related to the enhancement of desk-based information on soils and agricultural land quality, and the engagement with landowners and tenants to establish the nature and extent of agricultural, forestry and related rural enterprises.
- 2.1.4 Field and other data were interpreted using the MAFF's 1988 Revised Guidelines and Criteria for Grading the Quality of Agricultural Land<sup>10</sup>.

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<sup>1</sup> Cranfield University (2001). *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

<sup>2</sup> Soil Survey of England and Wales (1984). *Soils and Their Use in Midland and Western England*. Harpenden.

<sup>3</sup> Hollis J.M., 1985, *Soils in Staffordshire IV Sheet SK00/10 (Lichfield)*, Soil Survey Record No. 89, Harpenden.

<sup>4</sup> British Geological Survey. <http://bgs.ac.uk/geologyofbritain/home/html>.

<sup>5</sup> Meteorological Office. (1989) Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations.

<sup>6</sup> Ministry of Agriculture, Fisheries and Food (1983) Agricultural Land Classification of England and Wales (1:250,000).

<sup>7</sup> Department for Environment, Food and Rural Affairs (2005) Likelihood of Best and Most Versatile Agricultural Land (1:250,000).

<sup>8</sup> Multi-Agency Geographical Information for the Countryside (MAGIC) available on line @ [www.magic.gov.uk](http://www.magic.gov.uk).

<sup>9</sup> Hodgson, J.M. (1997), *The Soil Survey Field Handbook*. Soil Survey Technical Monograph no. 5, Silsoe.

<sup>10</sup> Ministry of Agriculture, Fisheries and Food (1988), Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.

- 2.1.5 Information obtained from farm impact assessment interview surveys has been taken as a factual representation of local agricultural and forestry interests and has not been subject to further evaluation.

## 2.2 Soils and land resources

- 2.2.1 This part of the technical appendix describes the findings of a desktop study and targeted soil survey and Agricultural Land Classification (ALC) survey that identified existing soil and agricultural land resources in the study area.

- 2.2.2 The location and extent of different soil types and agricultural land in the different ALC grades are influenced by topography and drainage, and by geology and soil parent materials, which are described in turn in the following sections. This section then provides a description and distribution of the main soil types encountered along the study corridor.

### Topography and drainage

- 2.2.3 The main topographical features within the study area are described in detail in the landscape and visual assessment (Section 9). The proposed route extends from just south of the Marl Pit and the county boundary in the south of the study area, rising from 80m above Ordnance Datum (AOD) to 110m AOD at the A453 Sutton Road. The route continues on the flank of the deeply dissected Pebble Beds Hills south-west of Hints at 90m to 110m AOD as far as the A5, and then runs north along a low watershed with undulating topography between 90m and 110m AOD, as far as the A51 Tamworth Road at Whittington Heath.
- 2.2.4 South of the A5, drainage is provided by several brooks, the largest of which are the Black-Bourne Brook and Gallows Brook, rising on the outskirts of Sutton Coldfield in the west and flowing towards the lower River Tame. North of the A5 there is a stream flowing eastwards and then northwards past Freeford Manor towards the lower Tame.

### Geology and soil parent materials

- 2.2.5 Superficial deposits are sparse along the Proposed Scheme. River Alluvium, comprising clay, silt, sand and gravel, is located south of Oak Dairy Farm and is associated with an area of floodplain at Gallows Brook. River Alluvium is also located on the floodplain of Black-Bourne Brook.
- 2.2.6 Superficial deposits of glacial till are located in two areas along the Proposed Scheme; between Shirrall Hall Farm and the A453 Sutton Road and in an isolated pocket at Defence Medical Services (DMS) Whittington (Whittington Barracks).
- 2.2.7 The Mercia Mudstone Group underlies the Proposed Scheme almost as far north as Roundhill Wood, and is described as red and green-grey mudstones and subordinate siltstones with widespread thin beds of gypsum and anhydrite. Sandstones, mudstones and conglomerate of the Enville Member underlie the Proposed Scheme between Roundhill Wood and Black-Bourne Brook with intermittent outcrops of the Hopwas Breccia Formation, described as interbedded breccia and sandstone. North of Black-Bourne Brook to the end of the study area, the overlying bedrock comprises sandstones and conglomerate of the Kidderminster Formation and pebbly sandstones of the Bromsgrove Sandstone Formation.



2.2.8 A list of geological strata occurring within the study area is provided in age order in Table 1 and shown on Map WR-02-021 (Volume 5).

Table 1: Bedrock and soil forming materials

Formation	Composition/soil parent material
<b>Superficial deposits</b>	
Alluvium	Clay, silt, sand and gravel.
Till – Mid Pleistocene	Variable lithology, usually sandy, silty clay with pebbles, but can contain gravel-rich, or sand layers.
<b>Bedrock</b>	
Mercia Mudstone Group- Mudstone	Red mudstones and layers of dolomitic siltstones.
Kidderminster Formation	Interbedded sandstone and conglomerate
Bromsgrove Sandstone Formation	Red, brown and grey, pebbly sandstones, interbedded with siltstones and mudstones.
Hopwas Breccia Formation	Coarse calcareous breccia interbedded with sandstones and mudstones
Envile Member	Red mudstone and red-brown sandstone, locally pebbly

### Description and distribution of soil types

2.2.9 The characteristics of the soils are described by the Soil Survey of England and Wales that accompanies the National Soil Map. A more detailed soil map and report are available for Drayton Bassett, Hints and Weeford area in the Soil Survey's Soils in Staffordshire IV, SK00/10 Lichfield (Hollis 1985). The soils are grouped into soil associations of a range of soil types (soil series) and are summarised in Table 2, and their distribution is shown on Map AG-02-021.

Table 2: Soil associations

Soil association: code shown on Map AG-02-19	Soil association: name	Description	Wetness class
541b	Bromsgrove	Well drained permeable reddish sandy loam over sandstone, deep in places; some clay loam or silty clay loam soils with slowly permeable subsoils of siltstone and sandstone and slight seasonal waterlogging	I-II
551a	Bridgnorth	Well drained sandy and sandy loam soils over soft sandstone, deep in places	I
572f	Whimple 3	Reddish clay loam or silty clay loam over clayey soils with slowly permeable subsoils and slight seasonal waterlogging; similar slowly permeable seasonally waterlogged soils on lower slopes, and clayey soils on brows	II-III
631e	Goldstone	Well drained very acid very stony acid sandy soils over conglomerate, and sandy loam soils over sandstone	I
711b	Brockhurst 1	Slowly permeable seasonally waterlogged reddish clay loam over clayey soils, with some similar soils with slowly permeable subsoils and slight seasonal waterlogging	III-IV
711n	Clifton	Slowly permeable seasonally waterlogged reddish clay loam and sandy loam soils, and similar soils with slight seasonal waterlogging; some deep sandy loam soils seasonally affected by groundwater	II-IV

Soil association: code shown on Map AG-02-19	Soil association: name	Description	Wetness class
831c	Wigton Moor	Permeable clay loam and sandy loam soils variably affected by groundwater depending on altitude	I-III
861b	Isleham	Deep permeable sandy and peaty soils affected by groundwater	II-IV

2.2.10 The National Soil Map shows six principal soil types within this community forum area:

- the Bromsgrove association is mapped south of Hints between Canwell Hall and the Bourne Brook. The principal soil types are permeable, free-draining reddish light loams over sandstone, deep in places and are in Wetness Class<sup>11</sup> (WC) I. There are also some light and medium loams with slowly permeable subsoils of siltstone and sandstone that experience slight seasonal waterlogging (WC I). Similarly, the Bridgnorth association has well-drained sandy and light loamy soils over soft, pebbly sandstones, deep in places (WC I). It occurs northwards to the boundary of the study area from where the route crosses the A5 between Hints and Weeford;
- land each side of the Black-Bourne Brook at Hints has soils of the Goldstone association of light, free-draining, very stony, acid soils over conglomerate and sandstone (WC I);
- Whimple 3 association is mapped on land overlying reddish mudstones to the north of Gallows Brook in the south of the study area. A thin drift cover gives loamy or silty topsoils and upper subsoils. The soils experience slight seasonal waterlogging on upper slopes (WC II), but on lower slopes and in hollows soils are seasonally waterlogged (WC III);
- land north of the A453 Sutton Road, as far as White House Farm, has soils of the Brockhurst 1 association developed on mudstones with thin superficial drift. Topsoils and upper subsoils are loamy or silty, but the slowly permeable clayey lower subsoils cause the dominant soils to be seasonally waterlogged for long periods over the winter (WC IV);
- a tract of land south of the A453 Sutton Road has soils of the Clifton association in deep, reddish light and medium loamy drift. Subsoils are slowly permeable, so that most soils are seasonally waterlogged (WC IV). Similar soils that experience only slight seasonal waterlogging occur on shedding sites with natural run-off (WC III).
- soils in parts of the Black-Bourne Brook valley are mapped as the Wigton Moor association in deep loamy drift deposits and sandy and gravelly alluvial soils that are variably affected by groundwater (WC III); and
- finally, a small valley head around Moor Covert, south of Packington Moor,

<sup>11</sup> The Wetness Class (WC) of a soil is classified in Appendix II of Hodgson, J.M. (1977) The Soil Survey Field Handbook. Soil Survey and Land Research Centre, Technical Monograph No.5, according to the depth and duration of waterlogging in the soil profile and has six bands ranging from Wetness Class I (well drained) to Wetness Class VI (permanently waterlogged).

contains the Isleham association of deep permeable sandy and peaty soils affected by groundwater (WC I or WC II where the land is cultivated and drained, or WC IV where the land is unimproved).

## 2.3 Soil and land use interactions

### Agricultural land quality

2.3.1 A review of available ALC information has been undertaken to ascertain the land quality within the study area. The review also sought to identify the extent of existing detailed post-1988 ALC information to ensure that surveys are not repeated unnecessarily, but there are none in this CFA.

2.3.2 ALC has been assessed from available information in the form of detailed (1:25,000 scale)<sup>12</sup> soil mapping and of archived Soil Survey records obtained from the National Soil Resources Institute (NSRI) at Cranfield University. In areas where no archived records were available some detailed field surveys were carried out for this project. In areas where land access was not granted a professional judgement was made using published soil maps and geological information.

### Detailed agricultural land classification

2.3.3 Fifty one auger bores were made specifically for this project and 38 bore records were obtained from NSRI.

2.3.4 The farms where soil surveys were carried out in 2012 and 2013 are CFA21/3 Wiggins Hill Farm, CFA21/12 Streetway Farm, CFA21/13 Packington Moor Farm and CFA21/15 Freeford Farm.

2.3.5 The principal physical factors influencing agricultural production and land quality in this CFA are climate, site and soil and the interactions between them.

2.3.6 Soil profiles were examined using an Edelman (Dutch) auger and a spade. Where soils were stony or dry a 2.5cm diameter screw auger was used to enable deeper penetration. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm where possible, or to any impenetrable layer:

- soil texture;
- significant stoniness;
- colour (including local gley and mottle colours);
- consistency;
- structural condition;
- free carbonate; and
- depth.

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<sup>12</sup> Hollis J.M., 1985, *Soils in Staffordshire IV Sheet SK00/10 (Lichfield)*, Soil Survey Record No. 89, Harpenden.

- 2.3.7 Soil available water capacity, relevant to the assessment of drought risk, was estimated from texture, structure, organic matter content, stone content and profile depth.

### Agro-climatic limitations

- 2.3.8 The local climatic factors have been interpolated from the Meteorological Office's database (Met Office 1989) held in the Landis climatic database at Cranfield University<sup>13</sup> at 1km intervals along the line of the track. The average of the parameters is given in Table 3. There is little variation across the CFA: FCDs are within the narrow range 150-151 days; average annual rainfall (AAR) is from 655mm to 677mm; moisture deficits are 99mm to 101mm for wheat and 89mm to 91mm for potatoes.

Table 3: Interpolated agro-climatic data

Climatic parameter	SP1757 9962 County boundary	SK1513 0321 Black Brook	SK1471 0550 Packington Moor
Altitude (m)	84	85	93
Average annual rainfall (mm)	655	662	677
Accumulated Temperature >0°C (Jan-June)	1384	1382	1372
Field Capacity Days (days)	150	150	151
Average Moisture Deficit, wheat (mm)	101	101	99
Average Moisture Deficit, potatoes (mm)	91	91	89

- 2.3.9 Climate itself does not place any limitation upon the land, but the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the soil.
- 2.3.10 The influence of climate on soil wetness is assessed by reference to median Field Capacity Days (FCD) when the soil moisture deficit is zero, WC and topsoil texture (Table 6, ALC Guidelines, 1988). Soil WC was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15cm thick.
- 2.3.11 The ALC grade according to soil wetness was determined by following the methodology set out in the ALC Guidelines (October, 1988)<sup>10</sup> and the information in the Table 4.

Table 4: ALC grade according to soil wetness – mineral soils (From Table 6 of ALC Guidelines, October 1988)<sup>10</sup>

Wetness class	Texture <sup>1</sup> of the top 25 cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
I	S <sup>2</sup> LS <sup>3</sup> SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b

<sup>13</sup> <http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf> Accessed Aug 2103.

Wetness class	Texture <sup>1</sup> of the top 25 cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
II	S <sup>2</sup> LS <sup>3</sup> SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
III	S <sup>2</sup> LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
IV	S <sup>2</sup> LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
V	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5

Soils in Wetness Class VI – Grade 5

Texture key: S – sand; LS – loamy sand; SL – sandy loam; SZL – sandy silt loam; ZL – silt loam; MZCL – medium silty clay loam; MCL – medium clay loam; SCL – sandy clay loam; HZCL – heavy silty clay loam; HCL – heavy clay loam; SC – sandy clay; ZC – silty clay; C – clay

<sup>1</sup> For naturally calcareous soils with more than 1% CaCO<sub>3</sub> and between 18% and 50% clay in the top 25 cm, the grade, where different from that of other soils, is shown in brackets.

<sup>2</sup> Sand is not eligible for Grades 1, 2 or 3a.

<sup>3</sup> Loamy sand is not eligible for Grade 1.

2.3.12 Droughtiness is determined by comparing crop-adjusted available water (AP), with the moisture deficit (MD) for the locality for wheat and potatoes (MAFF 1988 Appendix 4). Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs. The availability of irrigation can improve grading by one division where appropriate. However, irrigation is not common practice for grass cereals and oil seed rape (OSR). The calculation used in the ALC Guidelines (October, 1988)<sup>10</sup> to determine the severity of this limitation is given below in Figure 1.

Figure 1: Methodology for calculating the severity of a droughtiness limitation to ALC grading (derived from MAFF, 1988)

$$AP \text{ wheat (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{50}) + \sum (EA_{vs} \times LT_{50-120})}{10}$$

where

$TA_{vt}$  is Total available water ( $TA_v$ ) for the topsoil texture

$TA_{vs}$  is Total available water ( $TA_v$ ) for each subsoil layer

$EA_{vs}$  is Easily available water ( $EA_v$ ) for each subsoil layer

$LT_t$  is thickness (cm) of topsoil layer

$LT_{50}$  is thickness (cm) of each subsoil layer to 50 cm depth

$LT_{50-120}$  is thickness (cm) of each subsoil layer between 50 and 120 cm depth

$\Sigma$  means 'sum of'.

$$AP \text{ potatoes (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{70})}{10}$$

where

$LT_{70}$  is thickness (cm) of each subsoil layer to 70 cm depth

**MB (Wheat) = AP (Wheat) - MD (Wheat)**

**MB (Potatoes) = AP (Potatoes) - MD (Potatoes)**

Where

MB is the Moisture Balance

AP is the Crop-adjusted available water capacity

MD is the moisture deficit, as determined by the agro-climatic assessment.

**Table 8      Grade according to droughtiness**

Grade/ Subgrade	Moisture Balance limits (mm)		
	<i>wheat</i>		<i>potatoes</i>
1	+30	<i>and</i>	+10
2	+5	<i>and</i>	-10
3a	-20	<i>and</i>	-30
3b	-50	<i>and</i>	-55
4	<-50	<i>or</i>	<-55

### Site limitations

- 2.3.13 The assessment of site limitations is primarily concerned with the way in which topography influences the use of agricultural machinery and hence the cropping potential of land. Gradient and microrelief<sup>14</sup> are not considered limiting, except on steep hillsides south of Hints where slopes exceed 11 degrees. Here the land is in Grade 4. There is potential for flooding in the floodplains of the Black-Bourne Brook in the north and Gallows Brook area in the south. This is a potential limitation but its incidence is difficult to ascertain. Flooding is limited to the narrow floodplains of the Black-Bourne Brook and is a potential limitation, but its incidence is difficult to ascertain. Flood risk is determined by the extent, duration, frequency and timing of flooding events which may not have been recorded; however, the published Flood Maps by the Environment Agency can be used as a guide and flooding is not considered to be a limitation to agricultural land quality in this CFA.

### Soil limitations

- 2.3.14 The main soil properties which affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. Together they influence the functions of soil and affect the water availability for crops, drainage, workability and trafficability. Soils within the CFA often have sandy and sandy loam textures over sandstone of the Kidderminster Sandstone, Bromsgrove Sandstone and Hopwas Breccia Formations. Locally they are stony. Poor subsoil structure in association with heavy clay loam topsoils occurs in slowly permeable subsoils on mudstones. There is fluctuating groundwater in permeable soils in valleys and the extensive, low-lying spread of glaciofluvial deposits. Soil depth is a limitation where soils are thin over hard sandstone. Chemical limitations are not encountered.

### Interactive limitations

- 2.3.15 The physical limitations which result from interactions between climate, site and soil are soil wetness, droughtiness and erosion. Each soil can be allocated a WC based on soil structure, evidence and depth of waterlogging and the number of Field Capacity Days; where soil droughtiness is not a problem the topsoil texture and stone content then determines its ALC Grade. Thus, where there are 150 to 151 FCDs then a typical soil in the Brockhurst 1 association with a Wetness Class of III will be Subgrade 3a if the topsoil texture is a medium clay loam, and Subgrade 3b if it is a heavy clay loam.
- 2.3.16 Soil texture and structure determine the available water capacity of the soil profile; when calculated against the demands of a growing wheat and potato crop in the locality given by the climatic variable, the moisture deficit, a moisture balance is produced, from which a droughtiness limitation can be assessed according to MAFF 1988. The clay loam and silty clay loam over clayey soils of the Brockhurst 1 and Whimple 3 associations and the deep clay loams and silty clay loam of the Clifton association have sufficient moisture reserves in an average year to have no droughtiness limitation, or only one that limits the land to Grade 2. Light textured soils of the Bromsgrove, Bridgnorth and Goldstone associations, however, tend to have a smaller available water capacity; dominantly sandy loam soils are Grade 2 or

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<sup>14</sup> Complex changes of slope angle and direction over short distances or the presence of boulders or rock outcrops, even on level or gentle slopes, which can severely limit the use of agricultural machinery.

Subgrade 3a depending on the stone content, and sandy soils are Subgrade 3a or 3b, again depending on the stone content but also on depth to rock. Where irrigation facilities are available, and it is a current or recent practice, this is taken into account and may raise the Grade as the potential range and yield of crops (particularly horticultural and root crops) is increased.

- 2.3.17 In the Brockhurst 1 and Clifton associations, soils have slowly permeable subsoils. Where these occur below 41cm to 45cm depth, depending on location, and where soil wetness is accompanied by medium clay loam topsoil textures, the land is classed as Subgrade 3a, as these features become the main limitation restricting the range of crops. Within the Whimple 3 association the lead soil is allocated to Subgrade 3a where topsoils are medium clay loam or silty clay loam and slowly permeable subsoils occur between 52cm to 80cm depth (putting them in WCIII). Subgrade 3a is also given for droughtiness reasons on land with sandy or stony soils within parts of the Bridgnorth, Bromsgrove and Goldstone associations.
- 2.3.18 On the seasonally waterlogged soils of parts of the Brockhurst 1, Whimple and Clifton associations, where topsoils are heavy clay loam and a slowly permeable subsoil starts within 41cm to 45cm depth, the wetness/texture limitation is more restrictive and the safe working period shorter, the land is classed as Subgrade 3b. Areas of shallow sandy soils within the Bridgnorth association are also limited to Subgrade 3b because of droughtiness.
- 2.3.19 Grade 4 land occurs on steep slopes within the Bromsgrove and Goldstone associations south of Hints.

### **Summary of ALC assessment in CFA21**

- 2.3.20 The characteristics of the soil series encountered within each association and a summary of the key characteristics relevant to the ALC grading in CFA21 are given in Table 5 through Table 12.



## Appendix AG-001-021 | Soils and agricultural land classification surveys

Table 5: Bromsgrove Association (541b)

Well-drained permeable reddish sandy loam over sandstone, deep in places; some clay loam or silty clay loam soils with slowly permeable subsoils of siltstone and sandstone and slight seasonal waterlogging. Risk of water erosion.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 167 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Bromsgrove		Bromsgrove Sandstone, Kidderminster Formation and Hopwas Breccia	151	I	99 (110-100)	89 (90-75)	2, 3a or 4	Droughtiness. Grade 4 where gradients are steeper than 11 degrees
	Hodnet	Bromsgrove Sandstone, Kidderminster Formation and Hopwas Breccia	151	II	99 (110-80)	89 (80-75)	2 or 3a	Droughtiness with soil topsoil texture and wetness class locally
	Eardiston**	Bromsgrove Sandstone Kidderminster Formation and Hopwas Breccia	151	I	99 (105-75)	89 (85-55)	2, 3a or 3b*	Droughtiness

\* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a but where shallow over rock may be Subgrade 3b.

\*\* Eardiston series is a localised particularly on crests.

### Brief Soil Profile Descriptions

Bromsgrove	Hodnet	Eardiston
<p>0-30cm Ap: Dark reddish brown, stoneless sandy loam</p> <p>30-65cm Bw: Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure</p> <p>65-90cm BCu: Reddish brown, stoneless or slightly stony sandy loam; single grain structure</p> <p>At 90cm Cu: Soft weathered reddish brown sandstone</p>	<p>0-25cm Ap: Dark reddish brown, very slightly stony sandy silt loam or clay loam</p> <p>25-35cm Eb: Reddish brown, very slightly stony; weak coarse subangular blocky structure</p> <p>35-60cm Bt(g): Reddish brown, mottled, stoneless or slightly stony; moderate prismatic or angular blocky structure</p> <p>60-100cm Cg: Dark reddish brown, clay loam; massive structure</p> <p>100-120cm Cr: Reddish brown silty shale and sandstone</p>	<p>0-25cm Ap: Dark reddish brown, stoneless or slightly stony sandy loam or sandy silt loam</p> <p>25-40cm Bw: Reddish brown, slightly stony sandy loam; moderate medium angular blocky structure</p> <p>40-60cm BCu: Reddish brown slightly or moderately stony sandy loam; weak coarse angular blocky structure or single grain</p> <p>At 60cm R: Dark reddish grey hard bedded micaceous sandstone,</p>

Table 6: Bridgnorth Association (551a)

Well-drained sandy and sandy loam soils over soft sandstone, deep in places. Risk of water and wind erosion.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Bridgnorth		Bromsgrove Sandstone, Kidderminster Formation and Hopwas Breccia	151	I	99 (105-75)	89 (85-75)	3a or 3b*	Droughtiness
	Bromsgrove	Bromsgrove Sandstone Formation, Kidderminster Formation and Hopwas Breccia	151	I	99 (105-75)	89 (85-55)	2 or 3a	Droughtiness
	Newport	Glaciofluvial sands and gravels and river terrace deposits	151	I	99 (105-75)	89 (85-55)	2,3a or 3b*	Droughtiness

\* Where rock is at shallow depth or subsoil texture is sand and or stone content is moderate to high then grade is restricted to 3b by drought.

**Brief Soil Profile Descriptions**

Bridgnorth	Bromsgrove	Newport
0-25cm Ap: Dark reddish brown, stoneless loamy sand  25-50cm Bw: Reddish brown, stoneless loamy sand or sand; weak medium subangular blocky structure or single grain  50-60cm Cu: Reddish brown, slightly stony sand; single grain structure  At 60cm Cr: Reddish brown sandstone	0-30cm Ap: Dark reddish brown, stoneless sandy loam  30-65cm Bw: Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure  65-90cm BCu: Reddish brown, stoneless or slightly stony sandy loam; single grain structure  At 90cm Cu: Soft weathered reddish brown sandstone	0-25cm Ap: Dark brown, slightly stony sandy loam or loamy sand  25-55cm Bw: Brown, slightly stony loamy sand; weak fine subangular blocky structure  55-120cm Cu: Yellowish red or brownish yellow slightly or moderately stony loamy sand or sand; single grain structure

## Appendix AG-001-021 | Soils and agricultural land classification surveys

Table 7: Whimble 3 Association (572f)

Reddish medium loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging; some well-drained deep light loams.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Whimble		Mercia Mudstone Group	151	II-III	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class
	Worcester	Mercia Mudstone Group	151	III	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class
	Brockhurst	Mercia Mudstone Group	151	III-IV	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class

\* Where Subgrade is 3b the topsoil texture is heavy clay loam

### Brief Soil Profile Descriptions

Whimble	Worcester	Brockhurst
<p>0-25cm Ap: Dark brown slightly stony medium or heavy clay loam</p> <p>25-40cm Eb(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate medium subangular blocky structure</p> <p>40-60cm Bt(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate to coarse prismatic structure</p> <p>60-100cm 2BCtg: Reddish brown, mottled, stoneless clay; Coarse prismatic structure</p> <p>At 100cm Cr: Reddish mudstone</p>	<p>0-20cm Ap: Dark brown, stoneless or very slightly stony medium or heavy clay loam or clay</p> <p>20-50cm Bt(g): Reddish brown, stoneless silty clay or clay; strong coarse angular blocky structure</p> <p>50-100cm BCt(g): Reddish brown, stoneless silty clay or clay; strong coarse prismatic structure</p> <p>At 100cm Cr: Reddish mudstone</p>	<p>0-20cm Ap: Dark brown very slightly stony medium or heavy clay loam</p> <p>20-40cm Eg: Brown, mottled slightly stony clay loam; moderate medium subangular blocky structure</p> <p>40-75cm Btg: Reddish brown, mottled stoneless or very slightly stony clay; strong coarse prismatic structure</p> <p>75-100cm BCtg: Reddish brown mottled stoneless clay moderate coarse prismatic structure</p> <p>At 100cm Cr: Reddish mudstone</p>

Table 8: Goldstone Association (631e)

Well drained very acid very stony acid sandy soils over conglomerate, and sandy loam soils over sandstone.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat (max 101 min 97)	Potatoes (max 91 min 86)		
Goldstone		Bromsgrove Sandstone and Kidderminster Formation	151	III	99 (105-75)	89 (85-55)	2,3a,3b* or 4	Droughtiness. Grade 4 where gradient is steeper than 11 degrees
	Mercaston	Bromsgrove Sandstone and Kidderminster Formation	151	I	99 (105-75)	89 (90-75)	2, 3a or 3b*	Droughtiness. Locally 3a on topsoil texture and wetness class
	Eardiston	Bromsgrove Sandstone and Kidderminster Formation	151	I	99 (105-75)	89 (90-75)	2, 3a or 3b*	Droughtiness

\* Where subsoil texture is loamy sand and/or the soil is shallow on rock then Subgrade is 3b.

**Brief Soil Profile Descriptions**

Goldstone	Mercaston	Eardiston
0-5cm H: Black humose or organic sand  5-15cm Ah: Dark reddish brown, moderately stony sandy loam; weak fine subangular blocky structure  15-40cm Ea: Dark reddish grey, very stony sandy loam or loamy sand; weak fine granular structure  40-55cm Bh: Dusky red, very stony sandy loam; massive structure  55-60cm Bs: Reddish brown very stony sandy loam or loamy sand; massive structure  At 60cm R: Massive yellowish red conglomeratic sandstone	0-30cm Ap: Dark brown moderately stony medium clay loam  30-45cm Bw: Dark reddish brown, moderately stony sandy loam; weak medium granular structure  45-70cm Cu: Dark reddish brown, very stony sandy loam; weak fine granular structure	0-25cm Ap: Dark reddish brown, stoneless or slightly stony sandy loam or sandy silt loam  25-40cm Bw: Reddish brown, slightly stony sandy loam; moderate medium angular blocky structure  40-60cm BCu: Reddish brown slightly or moderately stony sandy loam; weak coarse angular blocky structure or single grain  At 60cm R: Dark reddish grey hard bedded micaceous sandstone

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Table 9: Brockhurst 1 Association (711b)

Slowly permeable seasonally waterlogged reddish clay loam over clayey soils, with some similar soils with slowly permeable subsoils and slight seasonal waterlogging.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Brockhurst		Mercia Mudstone Group	151	III-IV	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class
	Whimble	Mercia Mudstone Group	151	II-III	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class
	Salop	Till, Glaciolacustrine sands and gravels	151	III	99 (115)	89 (100)	3a or 3b*	Topsoil texture and wetness class

\* Where Subgrade is 3b the topsoil texture is heavy clay loam.

### Brief Soil Profile Descriptions

Brockhurst	Whimble	Salop
<p>0-20cm Ap: Dark brown very slightly stony medium or heavy clay loam</p> <p>20-40cm Eg: Brown, mottled slightly stony clay loam; moderate medium subangular blocky structure</p> <p>40-75cm Btg: Reddish brown, mottled stoneless or very slightly stony clay; strong coarse prismatic structure</p> <p>75-100cm BCtg: Reddish brown mottled stoneless clay moderate coarse prismatic structure</p> <p>At 100cm Cr: Reddish mudstone</p>	<p>0-25cm Ap: Dark brown slightly stony medium or heavy clay loam</p> <p>25-40cm Eb(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate medium subangular blocky structure</p> <p>40-60cm Bt(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate to coarse prismatic structure</p> <p>60-100cm 2BCtg: Reddish brown, mottled, stoneless clay; Coarse prismatic structure</p> <p>At 100cm Cr: Reddish mudstone</p>	<p>0-25cm Ap: Very dark greyish brown slightly stony medium or heavy clay loam</p> <p>25-45cm Eg: Brownish grey, mottled, slightly stony clay loam; moderate medium subangular blocky structure</p> <p>45-100cm Btg: Yellowish red, mottled, slightly stony; moderate to weak coarse prismatic structure</p> <p>100-120cm BCtg: Reddish brown, mottled, slightly stony clay; massive structure</p>

Table 10: Clifton Association (711n)

Slowly permeable seasonally waterlogged reddish clay loam and sandy loam soils, and similar soils with slight seasonal waterlogging; some deep sandy loam soils seasonally affected by groundwater.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Clifton*		Till and glaciofluvial sands and gravels	151	III	99 (125)	89 (110)	3a or 3b*	Topsoil texture and wetness class
	Salwick	Till and glaciofluvial sands and gravels	151	II	99 (125)	89 (110)	2	Topsoil texture and wetness class
	Quorndon	Till and glaciofluvial sands and gravels and river terrace	151	II-III	99 (125-100)	89 (85-75)	2 or 3a	Droughtiness with topsoil texture and wetness class locally

\*3b where topsoils are heavy clay loam.

#### Brief Soil Profile Descriptions

Clifton	Salwick	Quorndon
<p>0-25cm Ap: Dark greyish brown slightly stony medium or heavy clay loam or sandy clay loam</p> <p>20-35cm Eg: Greyish brown, mottled slightly stony clay loam or sandy clay loam; weak medium subangular blocky structure</p> <p>35-80cm Btg: Reddish brown, mottled, slightly stony clay loam or sandy clay loam; moderate coarse prismatic structure</p> <p>80-120cm BCtg: Reddish brown mottled slightly stony clay loam weak coarse prismatic or massive structure</p>	<p>0-25cm Ap: Dark brown slightly stony sandy loam or sandy clay loam</p> <p>25-40cm Eb(g): Brown, slightly mottled, slightly stony clay loam or sandy loam; weak subangular blocky structure</p> <p>40-700cm Bt(g): Reddish brown, slightly mottled, slightly stony clay loam; weak coarse prismatic structure</p> <p>700-120cm BCtg: Reddish brown, mottled, slightly stony clay loam; massive structure</p>	<p>0-25cm Ap: Dark brown, slightly stony sandy loam</p> <p>25-50cm Bg1: Yellowish brown, mottled, slightly to moderately stony sandy loam; weak medium subangular blocky structure</p> <p>50-80cm Bg2: Yellowish brown, mottled, slightly to moderately stony sandy loam; weak coarse subangular blocky or single grain structure</p> <p>80-120cm Cg: Pale to yellowish brown, mottled slightly to moderately stony loamy sand or sandy loam; single grain structure</p>

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Table 11: Wigton Moor Association (831c)

Permeable clay loam and sandy loam soils variably affected by groundwater depending on altitude, the drier soils being on slightly raised sites. Generally flat land.\*

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Wigton Moor		Glaciofluvial sands and gravels and river terrace	151	III	99 (125)	89 (100)	3a	Topsoil texture and wetness class
	Quorndon	Glaciofluvial sands and gravels and river terrace	151	II-III	99 (125-100)	89 (85-75)	2 or 3a**	Droughtiness. Topsoil texture and wetness class locally
	Arrow	Glaciofluvial sands and gravels and river terrace	151	II	99 (125-100)	89 (85-75)	2 or 3a**	Droughtiness

\* Soils of the Fladbury and Blithe series are included in alluvial valley bottoms bordering Black Brook and Bourne Brook.

\*\* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a by drought.

### Brief Soil Profile Descriptions

Wigton Moor	Quorndon	Arrow
0-25cm Ap: Dark greyish brown, slightly stony sandy clay loam or clay loam	0-25cm Ap: Dark brown, slightly stony sandy loam	0-25cm Ap: Dark brown, slightly stony sandy loam
25-50cm Bg1: Brown mottled slightly stony sandy clay loam or clay loam; medium subangular blocky structure	25-50cm Bg1: Yellowish brown, mottled, slightly to moderately stony sandy loam; weak medium subangular blocky structure	25-50cm Bw: Dark yellowish brown, slightly to moderately stony sandy loam; weak medium subangular blocky structure
50-80cm Bg2: Greyish brown with many ochreous mottles, moderately stony sandy clay loam or clay loam; weak coarse subangular blocky structure	50-80cm Bg2: Yellowish brown, mottled, slightly to moderately stony sandy loam; weak coarse subangular blocky or single grain structure	50-80cm Bwg: Brown, slightly mottled, slightly or moderately stony sandy loam or loamy sand; weak coarse subangular blocky structure
80-120cm Cg: Brownish grey with many ochreous mottles, moderately stony sandy loam or sandy clay loam; single grain structure	80-120cm Cg: Pale to yellowish brown, mottled slightly to moderately stony loamy sand or sandy loam; single grain structure	80-120cm BCg: Brownish yellow, mottled, slightly or moderately stony loamy sand or sandy loam; single grain structure

Table 12: Isleham 2 Association (861b)

Deep permeable sandy and peaty soils affected by groundwater.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 154 min 149)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Isleham		Glaciofluvial sands and gravels and river terrace	151	II-III	99 (125-100)	89 (85-75)	2 or 3a	Droughtiness with soil texture and wetness locally
	Ollerton	Glaciofluvial sands and gravels and river terrace	151	II-III	99 (125-100)	89 (85-75)	2 or 3a	Droughtiness with soil texture and wetness locally
	Blackwood	Glaciofluvial sands and gravels and river terrace	151	II-III	99 (125-100)	89 (85-75)	2 or 3a	Droughtiness with soil texture and wetness locally

**Brief Soil Profile Descriptions**

Isleham	Ollerton	Blackwood
0-30cm Ap: Very dark brown, slightly stony loamy sand  30-60cm Eag: Brown to dark brown, mottled, moderately stony sand; weakly developed coarse subangular blocky structure  60-120cm Bg: Light grey, mottled, stoneless sand; single grain structure	0-25cm Ap: Dark brown, stoneless or slightly stony sandy loam or loamy sand  25-50cm Bw(g): Dark yellowish brown, slightly mottled, slightly stony loamy sand; weak fine subangular blocky structure  50-90cm Bg: Light brown, mottled, slightly stony sand; weak subangular blocky structure or single grain  90-120cm Cg: Greyish brown, mottled, slightly stony sand; single grain structure	0-25cm Ap: Very dark greyish brown, slightly stony sandy loam or loamy sand  25-40cm Bg1: Pale brown, mottled, slightly stony loamy sand; weak medium and coarse subangular blocky structure  40-90cm Bg2: Light brownish grey, mottled slightly stony; weak medium subangular blocky or single grain structure  90-120cm Cg: Greyish brown mottled slightly stony sand; single grain structure





### 3 Forestry

- 3.1.1 Identification of forestry resources has primarily had regard to the National Forestry Inventory<sup>15</sup>.
- 3.1.2 The area of land under forestry (i.e. trees and woodland) within 2km either side of the route centre line has been determined using GIS and is shown in Table 13.

Table 13: Area of woodland within the study area and construction boundary

	Area of forestry land (ha)	Forestry land as a % of total land area
Forestry land in study area	399.9	11
Forestry land required permanently	8.1	4

- 3.1.3 Woodland is quite common over the area, especially around Hints, and represents 11% of land cover compared to the national average of 10%. Its relative abundance means it is considered as a resource of low sensitivity, as set out in the SMR Addendum (see Volume 5: Appendix CT-001-000/2).
- 3.1.4 Stands of woodland often occur on the steeper slopes with thin, very acid soils, such as Job's Hill (Volume 2: CFA21 Map Book, Map CT-10-60, E7), Rookery (Volume 2: CFA21 Map Book, Map CT-10-60, F7) and Roundhill Wood (Volume 2: CFA21 Map Book, MAP CT-10-60, H5) between Hints and Weeford.

<sup>15</sup> Forestry Commission (2001), National Forest Inventory Woodland and Ancient Woodland (as updated).

## 4 Assessment of effects on holdings

- 4.1.1 The effects on holdings have been assessed according to the methodology set out in Technical Note AG5 (within Appendix CT-001-000/2). The nature of impacts considered comprises the temporary and permanent land required from the holding, the temporary and permanent severance of land, the permanent loss of key farm infrastructure and the imposition of disruptive effects (particularly noise and dust) on land uses and the holding's operations. These impacts occur primarily during the construction phase of the Proposed Scheme.

Table 14: Summary of assessment of effect on holdings

Holding reference, name and description	Construction effects	Residual effects post restoration of land
CFA21/1  Brook Farm  114.5ha of General cropping (cereals and potatoes)  High sensitivity to change	Land required: 10.5ha; 9% of holding required for construction. Low Impact  Severance: severed area within construction boundary, hence no severance of agricultural land. Negligible Impact  Disruptive effects: none identified. Negligible Impact	Land required: 8.0ha; 7% of holding taken. Low Impact  Severance: severed area taken for ecological mitigation, hence no severance of agricultural land. Negligible Impact  Infrastructure: reinstatement of irrigation systems and flight ponds; restoration of drainage functionality. Negligible Impact
CFA21/2  South View Farm  6.9ha of Mainly livestock (suckler cows)  Medium sensitivity to change	Land required: 2.2ha; 32% of holding required for construction. High Impact  Severance: despite substantial land take for construction no severance occurs. Negligible Impact  Disruptive effects: Potential for noise effects (caravan site). Medium Impact	Land required: 2.2ha; 32% of holding taken. High Impact  Severance: Farm only affected by (substantial) land take. Negligible Impact  Infrastructure: reinstatement of water mains and field troughs; restoration of drainage functionality; fencing. Negligible Impact
CFA21/3  Wiggins Hill Farm  323.8ha of Mainly arable  Medium sensitivity to change	Land required: 11.4ha; 4% of holding required for construction. Negligible Impact  Severance: severed area within construction boundary, hence no severance of agricultural land. Negligible Impact  Disruptive effects: none identified. Negligible Impact	Land required: 8.8ha; 3% of holding taken. Negligible Impact  Severance: A small area is severed by Shirral Drive diversion, assume this is retained by HS2 and given over to planting. Negligible Impact  Infrastructure: restoration of drainage functionality. Negligible Impact

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA21/4</p> <p>Cranebrook</p> <p>19.4ha of Mixed arable and livestock</p> <p>Low sensitivity to change</p>	<p>Land required: All of the land parcel at Drayton Lane / A453 junction is required for construction. This comprises 12.7ha or 65% of the entire holding. Holding unable to continue as viable farm enterprise. High Impact</p> <p>Severance N.A (holding made unviable by construction activity). Negligible Impact</p> <p>Disruptive effects: (holding made unviable by construction activity). Negligible Impact</p>	<p>Land required: All of the land parcel at Drayton Lane / A453 junction is taken for mitigation planting. This comprises 12.7ha or 65% of the entire holding. Holding unable to continue as viable farm enterprise. High Impact</p> <p>Severance N.A. (holding made unviable by ecological mitigation). Negligible Impact</p> <p>Infrastructure: loss of both residential and agricultural buildings. High Impact</p>
<p>CFA21/5</p> <p>Drayton Lane End Farm</p> <p>37.2ha of Mainly arable and some grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 12.3ha; 33% of holding required for construction. Viability of holding, particularly equestrian services, compromised by substantial land loss. High Impact</p> <p>Severance access available off A453 (Sutton Road). Medium Impact</p> <p>Disruptive effects: Potential for noise effects (residences and horses). Medium Impact</p>	<p>Land required: 8.0ha; 22% of holding taken. High Impact</p> <p>Severance: access available off A453 (Sutton Road). Medium Impact</p> <p>Infrastructure: loss agricultural infrastructure (including manege) reinstatement of water mains and field troughs; restoration of drainage functionality; fencing. High Impact</p>
<p>CFA21/6</p> <p>Brook Farms</p> <p>451.2ha of Mainly arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 37.8ha; 8% of holding required for construction. Low Impact</p> <p>Severance: severance mitigated by provision of access managed under CoCP. Medium Impact</p> <p>Disruptive effects: note potential disruption to diversified activities (agricultural contracting, educational activities and commercial equestrian enterprise) by construction. Low Impact</p>	<p>Land required: 15.3ha; 3% of holding taken. Negligible Impact</p> <p>Severance: severance mitigated by provision of farm tracks and negotiation of access agreements. Medium Impact</p> <p>Infrastructure: access provision to severed land; reinstatement of water mains and field troughs; restoration of drainage functionality; fencing. Low Impact</p>
<p>CFA21/8</p> <p>Canwell Park</p> <p>1041.0ha of Mainly arable and some grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 6.8ha; 1% of holding required for construction. Negligible Impact</p> <p>Severance: very small area severed at chainage 175+375. Solution will be developed under CoCP. Negligible Impact</p> <p>Disruptive effects: none identified. Negligible Impact</p>	<p>Land required: 4.7ha; 1% of holding taken. Negligible Impact</p> <p>Severance: see opposite. Negligible Impact</p> <p>Infrastructure: restoration of drainage; reinstatement of field water supply. Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA21/9</p> <p>Rookery Farm</p> <p>50.6ha of Mainly grassland and some arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 2.4ha; 5% of holding required for construction.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 1.8ha; 4% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Infrastructure: access provision required; restoration of drainage; reinstatement of field water supply</p> <p>Negligible Impact</p>
<p>CFA21/10*</p> <p>Home Farm</p> <p>103.2ha of Mainly livestock (Sheep)</p> <p>Medium sensitivity to change</p>	<p>Land required: 29.9ha; 29% of holding required for construction.</p> <p>High Impact</p> <p>Severance: see opposite.</p> <p>Medium Impact</p> <p>Disruptive effects: note effects of limited access under Brockhurst Bridge.</p> <p>Negligible Impact</p>	<p>Land required: 29.9ha; 29% of holding taken.</p> <p>High Impact</p> <p>Severance: Brockhurst Lane underbridge (177-S1) provides restricted access, access to western fields will sometimes require extended journey to avoid this structure.</p> <p>Medium Impact</p> <p>Infrastructure: access provisions; reinstatement of field water supply, fencing.</p>
<p>CFA21/11</p> <p>Buck's Head Farm</p> <p>180.0ha of General cropping (cereals and potatoes)</p> <p>High sensitivity to change</p>	<p>Land required: 23.4ha; 13% of holding required for construction. Construction zone in close proximity to farm hub.</p> <p>Medium Impact</p> <p>Severance: access to SE corner of farm very likely to be restricted during construction.</p> <p>High Impact</p> <p>Disruptive effects: assume that the functionality of the farm hub is replicated elsewhere on the holding to allow agricultural activities to function seamlessly.</p> <p>Low Impact</p>	<p>Land required: 20.0ha; 11% of holding taken.</p> <p>Medium Impact</p> <p>Severance: access to SE corner of farm will be under Black Brook Viaduct (with potentially restricted headroom).</p> <p>High Impact</p> <p>Infrastructure: residential property, buildings housing farm and diversified activities as well as accommodation bridge demolished; farm hub likely to need relocation; reinstatement of river abstraction point, irrigation mains required; restoration of drainage functionality needed.</p> <p>High Impact</p>
<p>CFA21/12*</p> <p>Streetway Farm</p> <p>242.8ha of General cropping (cereals and potatoes)</p> <p>High sensitivity to change</p>	<p>Land required: 9.9ha; 4% of holding required for construction.</p> <p>Negligible Impact</p> <p>Severance: assumes across HS2 at Knox's Grave/ Flats Lane provided through CoCP.</p> <p>Medium Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 9.8ha; 4% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: block to the east of Flats Lane is cut by HS2, access to eastern part available off Knox's Grave Lane.</p> <p>Medium Impact</p> <p>Infrastructure: reinstatement of irrigation system.</p> <p>Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA21/13</p> <p>Packington Moor</p> <p>250.9ha of General cropping (cereals and potatoes) and livestock</p> <p>High sensitivity to change</p>	<p>Land required: 13.0ha; 5% of holding required for construction.</p> <p>Low Impact</p> <p>Severance: access to severed western part of farm will be needed during construction period. Assume that this will be provided under the CoCP.</p> <p>Medium Impact</p> <p>Disruptive effects: assume that the functionality of the farm hub is maintained / replicated elsewhere on the holding to allow agricultural activities to function seamlessly through construction phase. Disruption of customer access and perception to substantial diversified activities (e.g. wedding venue, farm shop and camp site) needs to be carefully managed effectively under CoCP.</p> <p>Low Impact</p>	<p>Land required: 12.6ha; 5% of holding taken.</p> <p>Low Impact</p> <p>Severance: Access track needed to ensure all areas of severed western block can be accessed off Tanworth Lane.</p> <p>Medium Impact</p> <p>Infrastructure: residential property as well as buildings housing farm and diversified activities demolished; farm hub likely to need relocation; reinstatement of irrigation and field trough water supply systems required; restoration of drainage functionality needed; access provisions required; fencing.</p> <p>High Impact</p>
<p>CFA21/14</p> <p>Horsley Brook Farm</p> <p>66.0ha of Equestrian (commercial)</p> <p>High sensitivity to change</p>	<p>Land required: 26.2ha; 40% of holding required for construction. Land take of this scale means that equestrian activities (racehorse training) unlikely to be viable in their current form.</p> <p>High Impact</p> <p>Severance: land that would have been severed incorporated into construction zone.</p> <p>Negligible Impact</p> <p>Disruptive effects: noise impacts (racehorse training).</p> <p>Medium Impact</p>	<p>Land required: 25.4ha; 39% of holding taken (see opposite).</p> <p>High Impact</p> <p>Severance: Land that would have been severed from farm hub instead taken for ecological mitigation.</p> <p>Negligible Impact</p> <p>Infrastructure: loss of all weather gallops; reinstatement of field water supplies likely to be needed.</p> <p>High Impact</p>
<p>CFA21/15</p> <p>Freeford Manor</p> <p>402.7ha of Mixed arable and livestock (including dairy)</p> <p>High sensitivity to change</p>	<p>Land required: 29.5ha; 7% of holding required for construction.</p> <p>Low Impact</p> <p>Severance: access to severed eastern fields available off Darnford Lane and Litchfield Road.</p> <p>Medium Impact</p> <p>Disruptive effects: no significant impacts identified.</p> <p>Negligible Impact</p>	<p>Land required: 19.9ha; 5% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: access to severed eastern fields available off Darnford Lane and Litchfield Road.</p> <p>Medium Impact</p> <p>Infrastructure: reinstatement of irrigation and field water supply systems ; restoration of drainage functionality; access provisions off public highway to severed land.</p> <p>Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA21/17*</p> <p>Oak Dairy Farm</p> <p>24.2ha of Mainly grassland and some arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 10.2ha; 42% of holding required for construction. Holding unable to continue as a viable farm enterprise.</p> <p>High Impact</p> <p>Severance: access around farm very likely to be restricted during construction.</p> <p>Medium Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 9.2ha; 38% of holding taken (see opposite).</p> <p>High Impact</p> <p>Severance: assume access to severed southern section provided off Shirrall Drive and access to severed eastern section provided off Hs2 access track to Drayton Lane ATS.</p> <p>Medium Impact</p> <p>Infrastructure: restructuring of access; reinstatement of field water supply systems; restoration of drainage functionality; rationalisation of field boundaries / fencing.</p> <p>Low Impact</p>
<p>CFA21/18</p> <p>Shirrall Hall Farm</p> <p>18.6ha of Mainly livestock (Sheep)</p> <p>Medium sensitivity to change</p>	<p>Land required: 1.1ha; 6% of holding required for construction.</p> <p>Low Impact</p> <p>Severance: no severance.</p> <p>Negligible Impact</p> <p>Disruptive effects:</p> <p>Negligible Impact</p>	<p>Land required: 0.7ha; 4% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing.</p> <p>Negligible Impact</p>
<p>CFA21/19</p> <p>Hudson's Equestrian Unit</p> <p>23.5ha of Equestrian (commercial)</p> <p>High sensitivity to change</p>	<p>Land required: 3.9ha; 17% of holding required for construction. Note that the land that is taken or lowered by the scheme is the only land on the holding that can practically be used to put horses out for grazing. Viability of this unit is therefore compromised.</p> <p>Medium Impact</p> <p>Severance: all land to east of Hs2 alignment in construction zone.</p> <p>Negligible Impact</p> <p>Disruptive effects: Holding unable to continue as a viable farm enterprise due to effect of noise on horses.</p> <p>Medium Impact.</p>	<p>Land required: 3.7ha; 16% of holding taken.</p> <p>Medium Impact</p> <p>Severance: assumed that all of area to east of the alignment is taken by Hs2, hence no severance of agricultural land.</p> <p>Negligible Impact</p> <p>Infrastructure: reinstatement of field water supply systems; restoration of drainage functionality; fencing.</p> <p>Negligible Impact</p>
<p>CFA21/20*</p> <p>Oak Tree Farm</p> <p>23.9ha of Mainly livestock (suckler cows)</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.1ha; 0% of holding required for construction.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.1ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality.</p> <p>Negligible Impact</p>
<p>CFA21/21*</p> <p>New House Farm</p> <p>17.0ha of Equestrian (commercial)</p> <p>High sensitivity to change</p>	<p>Land required: 0.1ha; &lt;1% of holding required for works associated with pylons.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Infrastructure: fencing.</p> <p>Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA21/22*</p> <p>Holt Farm</p> <p>3.3ha of Equestrian (commercial)</p> <p>High sensitivity to change</p>	<p>Land required: 1.7ha; 52% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact (worst case prediction)</p> <p>Severance: if access to temporarily severed land is needed, this can be managed through CoCP.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none – assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>
<p>CFA21/23*</p> <p>Bourne Brook Farm</p> <p>35.1ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 7.4ha; 21% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact (worst case prediction)</p> <p>Severance: if access to temporarily severed land is needed, this can be managed through CoCP.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none – assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>
<p>CFA21/24*</p> <p>Brockhurst Stables</p> <p>18.9ha of Equestrian (commercial)</p> <p>High sensitivity to change</p>	<p>Land required: 3.0ha; 16% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact (worst case prediction)</p> <p>Severance: if access to temporarily severed land is needed, this can be managed through CoCP.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none – assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>
<p>CFA21/25*</p> <p>Land east of Brockhurst Lane</p> <p>16.7ha of Mainly livestock (cattle and sheep)</p> <p>Medium sensitivity to change</p>	<p>Land required: 6.5ha; 39% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact (worst-case prediction)</p> <p>Severance: if access to temporarily severed land is needed, this can be managed through CoCP.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none – assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>

\* No farm impact assessment interview conducted; data estimated.





## 5 References

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